REMARKS

This is in response to the Office Action of 20 October 2004. Claims 1-20 are pending in the application, Claims 1-9 are withdrawn from consideration, and Claims 10-20 have been rejected.

By this Response and Amendment, Claims 1-9, 13, and 19 have been cancelled, and Claims 10-11, and 15-17 have been amended.

No new matter has been added.

In view of the amendments above and remarks below, Applicants respectfully request reconsideration and further examination.

About The Invention

The present invention relates generally to methods for forming a shallow trench isolation structure in such a manner that a conventionally required etch stop layer is no longer needed. More particularly, a shallow trench isolation structure in accordance with the present invention is filled with a dielectric material having etch characteristics substantially different from those of an overlying inter-layer dielectric material. In this way, contact holes can be etched through the inter-layer dielectric material which overlap with the shallow trench isolation structures wherein the contact hole etching process does not remove any significant amount of material from the shallow trench isolation structure.

Drawings

The Examiner has required that Fig. 1 be labelled as prior art.

Submitted herewith is a Replacement Sheet including Fig. 1 which has been amended to include the label "Prior Art". In view of the submission of this Replacement Sheet, Applicants respectfully submit that the Examiner's objection to the drawings has been overcome.

Cancellation of Non-elected Claims 1-9

In a previous response Applicants elected to pursue the invention of Claims 10-20, and consequently Claims 1-9 were withdrawn from further consideration in this Application. In this Response, Applicants have cancelled the non-elected Claims without prejudice or disclaimer.

Non-narrowing Claim Amendments

Claims 11 and 15-16 have been amended in a non-narrowing manner to correct various typographical errors. No change in the scope of Claims 11 and 15-16 is intended by these corrections of typographical errors.

Rejections under 35 USC §102(e)

Claims 10, 13-15, 17, and 19-20 have been rejected under 35 USC §102(e) as being anticipated by Applicants' Admitted Prior Art.

Claims 13 and 19 have been cancelled, thereby rendering the rejections thereof moot.

Independent Claims 10 and 17 have been amended to recite that the material used to fill the shallow trench is different from the material used to form the intermetal dielectric layer, and that these two materials have different etch characteristics such that the material that fills the shallow trench may be exposed to the intermetal dielectric layer etching process without having any significant amount of material etched away. These Claims have been further amended to make clear that the intermetal dielectric layer is disposed directly on the selective etch material that fills the shallow trench space. Support for these amendments can be found generally throughout the specification, and can be found more particularly in the specification at page 14, and in Fig. 2.

The alleged admissions of prior art cited by the Examiner do not disclose the physical layout or the material characteristics that are recited by the amended Claims. More particularly, the amended Claims require the intermetal dielectric layer to be in direct contact with the selective etch isolation material, which leaves no room for the etch stop layer 130 shown in Fig. 1. Further, Applicants describe in conjunction with Fig. 1 that both dielectric layer 120 and the material 150, which fills the shallow trench space, to be oxides, which is different from the recitation of amended Claims 10 and 17 which require different materials with different etch characteristics.

In view of the amendments to independent Claims 10 and 17, Applicants respectfully submit that the rejection of independent Claims 10 and 17 has been overcome. Applicants further submit that rejection of dependent Claims 14-15 and 20 has similarly been overcome.

Rejections under 35 USC §103(a)

Claims 11-12, 16, and 18 have been rejected under 35 USC §103(a) as being unpatentable over admitted prior art, in view of Goh, et al., (US Patent 6,225,225).

Goh, et al., disclose a method of forming shallow trench isolation trenches for use with borderless contacts. A silicon nitride layer protects the shallow trench oxide layer from overetch damage. A silicon substrate is provided. A pad oxide layer is grown. A polishing stop layer, of polysilicon or silicon nitride, is deposited. The polishing stop layer, pad oxide layer, and silicon substrate are patterned to form the shallow trenches. A trench oxide layer is deposited to fill the shallow trenches. The trench oxide layer is polished down with the polishing stop layer as a polishing stop. The trench oxide layer is etched down to a level below that of the pad oxide layer. A silicon nitride layer is deposited. A polishing layer of oxide is deposited. The polishing layer and the silicon nitride layer are polished down with the polishing stop layer as a polishing stop. The polishing

stop layer is etched away. The silicon nitride layer is etched to remove vertical sidewalls. The polishing layer and the pad oxide layer are etched away with the silicon nitride layer as etching stop to complete the shallow trench isolations.

Claims 11-12, and 16; and Claim 18 depend respectively from amended independent Claims 10 and 17. The amended independent Claims, as discussed above, recite limitations that include the intermetal dielectric layer and the selective etch material, which fills the shallow trench space, to be in direct contact. This is different from the combination of admitted prior art and the disclosure of Goh, et al. In fact, Goh, et al., teach the formation of a shallow trench isolation structure which has a two layer filling, as opposed to Applicants' claimed one material filling. That is Goh, et al., disclose an oxide filling that partially fills the shallow trench, with a silicon nitride capping layer that is coplanar with the wafer surface. This requires a significantly more complex process than that which is made possible by Applicants' claimed invention.

In view of the foregoing, Applicants respectfully submit that the rejection Claims 11-12, 16 and 18 has been overcome.

Conclusion

All of the rejections in the outstanding Office Action of 20 October 2004 have been responded to, and Applicant respectfully submits that the pending Claims 10-12, 14-18, and 20 are now in condition for allowance.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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